

1. A voltage control circuit for supplying a motor with its motor design voltage using a voltage source, comprising:

difference means for measuring a difference between a line voltage generated by the voltage source and the motor design voltage; and

correction means for generating a correction voltage based on the difference between the line voltage and the motor design voltage that can be combined with the line voltage to produce the motor design voltage, and for combining the correction voltage with the line voltage to produce the motor design voltage.

2. The voltage control circuit of claim 1, wherein:

the line voltage has a line voltage frequency and a line voltage phase;

and

the correction voltage has a correction voltage frequency equal to the line voltage frequency and a correction voltage phase that is phase-shifted with respect to the line voltage phase in an amount proportional to the difference between the line voltage and the motor design voltage.

3. The voltage control circuit of claim 2, wherein:

the difference means generates an error voltage proportional to the difference between the line voltage and the motor design voltage;

the correction means includes a bridge switching signal means for generating a bridge-switching signal based on the error voltage; and

the correction means generates the correction voltage based on the bridge switching signal.

4. The voltage control circuit of claim 3, wherein the bridge-switching signal is phase-shifted with respect to the line voltage phase based on the error voltage.

5. The voltage control circuit of claim 4, wherein the correction means includes:

a bridge circuit;

a bridge voltage source connected to the bridge circuit; and

wherein the bridge-switching signal causes the bridge circuit to generate the correction voltage.

A) 6. The voltage control circuit of claim 5, wherein the bridge voltage source includes storage means for storing inductive energy generated by the motor and supplying the stored inductive energy to the bridge circuit to generate the correction voltage.

7. The voltage control circuit of claim 6, wherein the correction voltage includes a square-wave voltage.

8. The voltage control circuit of claim 7, wherein the bridge circuit includes four switching devices.

9. The voltage control circuit of claim 8, wherein the storage means includes one or more capacitors.

10. The voltage control circuit of claim 9, wherein the bridge-switching signal has a 50% duty cycle.

11. The voltage control circuit of claim 10, wherein each switching device includes a MOSFET.

12. The voltage control circuit of claim 11, wherein the bridge switching signal means includes:

a zero-crossing detector;

an inverter connected to an output of the zero-crossing detector;

a first ramp generator connected to the output of the zero-crossing detector;

a second ramp generator connected to an output of the inverter;

a first comparator connected to an output of the first ramp generator and connected to the error voltage;

A | a second comparator connected to an output of the second ramp generator and connected to the error voltage; and

a flip-flop connected to an output of the first comparator and an output of the second comparator.

13. A voltage control circuit, comprising:

a difference circuit adapted to be connected to a motor design voltage and a voltage source; and

a correction circuit connected to the difference circuit, the correction circuit including

a bridge circuit adapted to be connected to the voltage source and a motor designed to operate at the motor design voltage,

a bridge voltage source connected to the bridge circuit, and

a bridge control circuit connected to the bridge circuit and the difference circuit, and adapted to be connected to the voltage source.

14. The voltage control circuit of claim 13, wherein the bridge voltage source includes a storage device.

15. The voltage control circuit of claim 14, wherein the storage device includes one or more capacitors.

16. The voltage control circuit of claim 15, wherein the bridge circuit includes four switching devices.

A 17. The voltage control circuit of claim 16, wherein each switching device includes a MOSFET.

18. The voltage control circuit of claim 17, wherein the bridge control circuit includes:

a zero-crossing detector;

an inverter connected to an output of the zero-crossing detector;

a first ramp generator connected to the output of the zero-crossing detector;

a second ramp generator connected to an output of the inverter;

a first comparator connected to an output of the first ramp generator and connected to the error voltage;

a second comparator connected to an output of the second ramp generator and connected to the error voltage; and

a flip-flop connected to an output of the first comparator and an output of the second comparator.

19. The voltage control circuit of claim 18, wherein the voltage control circuit is connected to the motor.

20. The voltage control circuit of claim 19, wherein the voltage control circuit is connected to the voltage source.

21. A method of supplying a motor with its motor design voltage using a voltage source, comprising the steps of:

measuring a difference between a line voltage generated by the voltage source and the motor design voltage; and

generating a correction voltage based on the difference between the line voltage and the motor design voltage that can be combined with the line voltage to produce the motor design voltage; and

combining the correction voltage with the line voltage to produce the motor design voltage.

22. The method of claim 21, wherein:

the line voltage has a line voltage frequency and a line voltage phase;  
and

the step of generating a correction voltage includes the step of generating a correction voltage having a frequency equal to the line voltage frequency and a correction voltage phase that is phase-shifted with respect to the line voltage phase in

an amount proportional to the difference between the line voltage and the motor design voltage.

23. The method of claim 22 wherein the step of generating a correction voltage includes the steps of:

generating an error voltage proportional to the difference between the line voltage and the motor design voltage;

generating a bridge-switching signal based on the error voltage; and

generating the correction voltage based on the bridge-switching signal.

24. The method of claim 23, wherein the step of generating a bridge-switching signal includes the step of generating a bridge-switching signal phase-shifted with respect to the line voltage phase based on the error voltage.

25. The method of claim 24, wherein the step of generating the correction voltage based on the bridge-switching signal includes the steps of:

supplying energy to a bridge circuit using a bridge voltage source; and

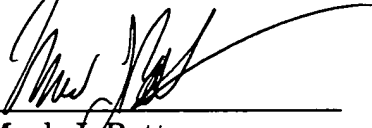
applying the bridge-switching signal to the bridge circuit thereby causing the bridge circuit to generate the correction voltage.

26. The method of claim 25, further comprising the step of supplying energy to the bridge voltage source using the motor.

27. The method of claim 26, wherein the step of generating a correction voltage includes the step of generating a square-wave voltage.

The Commissioner is authorized to charge any deficiency or credit any overpayment associated with the filing of this Preliminary Amendment to Deposit Account 23-0035.

Respectfully submitted,

  
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